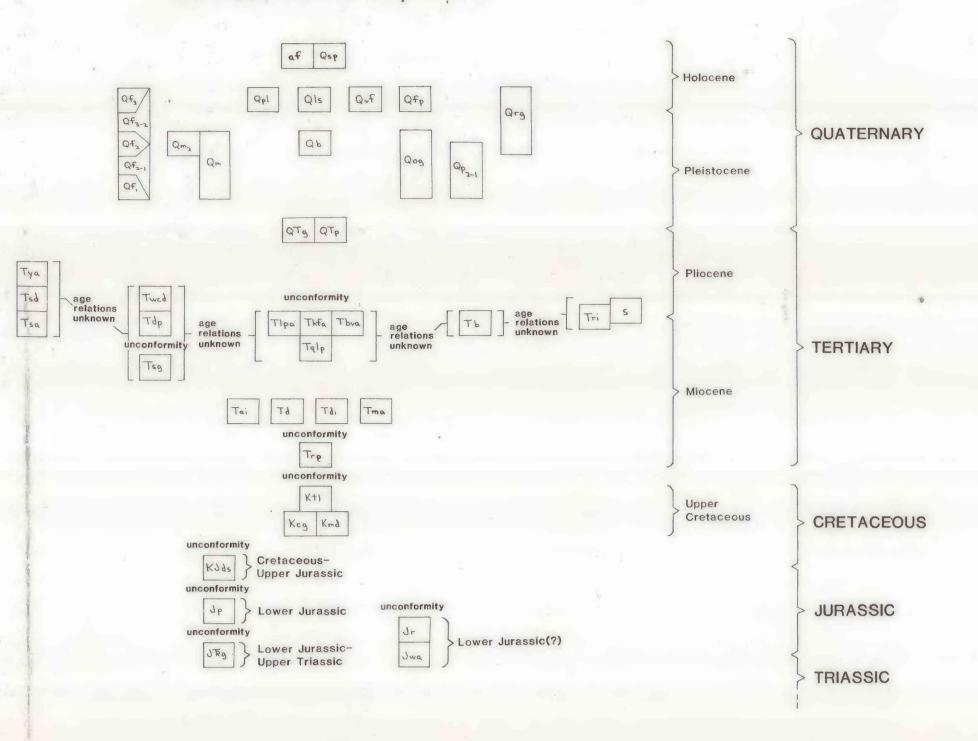
## TOPAZ LAKE QUADRANGLE UNITED STATES CALIFORNIA-NEVADA DEPARTMENT OF THE INTERIOR 5 MINUTE SERIES (TOPOGRAPHIC GEOLOGICAL SURVEY Heavy-duty Light-duty Medium-duty Unimproved dirt An int of costant lake 1954 Field thech 1956 Policianic projection 927 North American datum U.S. Route State Route and 3, and Nevada chordinate system, well mag CONTOUR INTERVAL 80 FEET HONAL GEODETIC VERTICAL DATUM OF 1929 Charles Universal Transverse Mercator grid holis TOPAZ LAKE, CALIF.-NEV. Bure naturing burding lopazitah indicates ama to ontrolled munication. Maximum elevation 5005 Daniel land line indicate approximate locations Linchet ked elevations are shown in brown AMS 2061 H-SERIES V795

## RECONNAISSANCE GEOLOGIC MAP OF THE TOPAZ LAKE 15 MINUTE QUADRANGLE, CALIFORNIA AND NEVADA

David A. John, James Giusso, William J. Moore, and Richard A. Armin with Quaternary geology by John C. Dohrenhend

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

## CORRELATION OF MAP UNITS



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**OPEN-FILE REPORT** 

Geologic contacts, dashed where approximately located, dotted where concealed Faults, dashed where approximately located, dotted where concealed; bar and ball on downthrown side Thrust faults; sawteeth in upper plate Strike and dip of beds Horizontal beds Strike and dip of flow foliation in volcanic rocks Strike and dip of foliation in metamorphic rocks Moraine crests Sections within the Relief Peak Formation comprised dominantly of andesitic lahars

INDEX TO GEOLOGIC MAPPING 1-3. John, D. and Moore W. J., Reconnaissance geologic mapping 1980 assisted by L. Lynch with information from: Curtis (1951) Wilshire (1957) 4-5. John, D., and Armin, R., Reconnaissance geologic mapping 1980 with • Curtis (1951) and Stanford Geology Survey (1964)

Simplified from D. Hudson (1980), unpublished mapping. Stanford Geologic Survey (1964)

. Wilshire (1957 1-9. Quaternary geology by J. C. Dohrenwend (1979, 1980).

Tsa SILVER PEAK ANDESITE (Wilshire, 1957) (late Miocene) -- Similar to the Relief Peak Formation. Unaltered andesitic lahars and breccias DESCRIPTION OF MAP UNITS predominate but unit also includes hornblende pyroxene andesite lows and minor quantities of pyroclastic rocks and volcaniclastic COLD SPRING DEPOSITS (Holocene) -- Actively forming light-brown calcareous cold spring deposits west of Poison Flat. Numerous sediments. Unlike the Relief Peak Formation, the andesite flows commonly have weak columnar and platy jointing. Generally the basal contact with the Relief Peak Formation was placed at a break other cold spring deposits nearby are too small to show at map in slope, although in other places the contact is more or less arbitrary (also see Wilshire (1956, p. 70)

DACITE OF UPPER WOLF CREEK (late Miocene-early Plicene)—Light-gray finely vesicular porphyritic quartz augite hornblende dacite flows YOUNG ALLUVIAL FAN DEPOSITS (Holocene) -- Poorly sorted bouldery sand and gravel. Includes some valley-fill deposits in low-gradient valleys where distal fan limits are gradational and poorly and intrusions overlying and intruding the Disaster Peak and Relief defined. Fan surfaces are undissected to slightly dissected with , if any, well-defined drainage channels. Fan drainage is eak Formations on a ridge approximately 5 km west of Soda Springs distributary, radiating from the fan apex. Generally unweathered, with weak, if any, soil profile development

UNDIFFERENTIATED INTERMEDIATE AND OLD ALLUVIAL FAN DEPOSITS

Pleistocene) -- Mapped in areas where intermediate and old alluvial

imited to the northeast side of Slinkards Valley and the south end

fan deposits are too complexly interrelated to be mapped separately or where more precise age relationships could not be determined

of Bagley Valley
OLD ALLUVIAL FAN DEPOSITS (Pleistocene) -- Similar lithologically to

young and intermediate alluvial fan deposits. Fan surfaces are deeply dissected by well-developed subparallel drainage that heads

15 m. Constructional fan surfaces are strongly weathered with

moderately well to well developed soil profiles. Limited to one

PLAYA DEPOSITS (Holocene) -- Layered sand, silt, and clay in the bottoms of dry ponds and lakes. Occurs in a few small structurally

LANDSLIDE DEPOSITS (Holocene) -- Unsorted angular boulder- to clay-size

controlled depressions in upland areas of the northern part of the

debris. Occur generally as lobate masses in steep mountain

with the landslide debris. Over 20 major landslides occur in the

quadrangle, and approximately 70 percent of these involve Tertiary volcanic rocks. Seven landslides exceed 1 km2 in area VALLEY-FILL DEPOSITS (Holocene) -- Undifferentiated alluvium underlying

low-gradient floors of alpine valleys. Includes stream channel and

flood plain alluvium, low-gradient alluvial-fan deposits, glacial outwash deposits, and lacustrine deposits, often associated with

glacial drift. Limited to the valleys of Wolf Creek and the East

FLOOD-PLAIN ALLUVIUM (Holocene) -- Moderately to poorly sorted gravelly

low-relief flood-plain topography
ROCK GLACIER DEPOSITS (Holocene)--Highly angular bouldery gravel.

to silty sand and sandy to clayey silt. Stream channel and overbank deposits along low-gradient streams (the West Walker River

Unweathered. Including and closely associated with blocky talus. Characterized by distinctive lobate morphology. Limited to one

area between 9,000 and 9,600 ft on the east flank of the ridge

age) -- Unsorted to very poorly sorted bouldery to clayey gravel that is slightly compacted. Associated with undissected to slightly

dissected sharp crested lateral moraines and slightly to moderately

dissected terminal moraines. Granitic boulders on surface are slightly to moderately weathered and soil profiles generally are

weakly developed. Includes some talus, valley fill, and alluvial fan deposits which are intimately associated with the glacial drift

8,000 ft in Bull Canyon
UNDIFFERENTIATED GLACIAL MORAINE DEPOSITS (Pleistocene) -- Unsorted to

BASALT (Pleistocene) -- Light-gray to black finely porphyritic olivine

East Fork of the Carson River and Silver King Creek

Antelope Valleys and the south end of Gold Hill

very poorly sorted bouldery to clayey gravel. Generally lacks diagnostic constructional form. Limited to areas southwest of the

basalt flows. Contain sparse small phenocrysts of fresh olivine,

plagioclase, and augite in an aphanitic groundmass
OUTWASH GRAVEL DEPOSITS (Pleistocene) -- Poorly to moderately sorted
silt, sand, and gravel. Preserved as discontinuous fluvial terrace

the mouth of Wolf Creek
PEDIMENT DEPOSITS (Pleistocene) -- Lithologically, sedimentologically,

remnants along the East Fork of the Carson River downstream from

and morphologically similar to older alluvial fan deposits, except

that the pediment deposits occur as veneers on pedimenter bedrock. Limited to one up-faulted area at the northeast end o

Silver and Highland Peaks along the extreme western edge of the quadrangle. Contain approximately 10 to 12 percent phenocrysts of plagioclase, biotite, sanidine, quartz, and hornblende set in colorless to pale-brown glass. Overlies the Silver Peak Andesite

Little Antelope Valley
GRAVEL DEPOSITS (Pleistocene and (or) Pliocene)—Coarse unsorted

o small to be mapped separately. Limited to elevations above

area at the north end of Slinkards Valley

Fork of the Carson River

between Wolf Creek and Dumonds Meadows

Tdp DISASTER PEAK FORMATION (Slemmons, 1966) (Miocene)-Thin volcanic sequence of gray to brown unbrecciated and autobrecciated UNDIFFERENTIATED YOUNG AND INTERMEDIATE ALLUVIAL FANS (Holocene-late hornblende-rich andesite flows; heterogeneous light-gray to pink Pleistocene) -- Mapped in areas where young and intermediate fan andesitic lahars; and minor amounts of brown volcaniclastic sediments. The andesite flows typically contain hornblende surfaces are too complexly interrelated to be mapped separately or where more precise age relationships could not be determined
INTERMEDIATE ALLUVIAL FAN DEPOSITS (Pleistocene)--Similar phenocrysts up to 6 mm long in a fine-grained gray groundmass. The Disaster Peak Formation unconformably overlies the Stanislaus Group lithologically and sedimentologically to young alluvial fan deposits. Contacts between young and intermediate alluvial fan STANISLAUS GROUP, UNDIFFERENTIATED (Slemmons, 1966; Noble and others, deposits are commonly gradational and poorly defined. Intermediate 1974) (Miocene) -- In the map area consists of Table Mountain Latite alluvial fan surfaces are slightly to moderately dissected, with numerous well-defined well-incised drainage channels. Drainage is and Eureka Valley Tuff. Comprises a sequence of red, brown, and black interbedded latite, andesite, and basalt flows and pyroclastic rocks. The Table Mountain Latite includes black finepredominantly distributary, but some channels head on the fan surface. Relief due to dissection is generally less than 7 m. grained porphyritic basalt with small plagioclase phenocrysts; light-red vesicular latite porphyry with large plagioclase phenocrysts; and dark-red latite breccia. The Eureka Valley Tuff Constructional surfaces are slightly to moderately weathered with weak to moderate soil profile development. Limited to the larger nonglaciated valleys (Bagley, Slinkards, Little Antelope, and onsists of a series of moderately welded biotite augite lithic

> flattened glassy streaks up to 5 cm long. K-Ar ages of 10.0 to 8.8 m.y. are reported by Noble and others (1974) for the Stanislaus Group in adjacent quadrangles. The Stanislaus Group unconformably verlies the Relief Peak Formation and is unconformably overlain by the Disaster Peak Formation LEVIATHAN PEAK ANDESITE (Curtis, 1951) (late Miocene(?)-early Pliocene)--Dark blue-gray, orangish-brown weathering, platy-jointed, flow-banded porphyritic hornblende andesite flows and shallow intrusions. Characterized by strong flow foliation defined by subparallel alinement of plagicclase and hornblende crystals and by hornblende phenocrysts which locally reach 5 cm in Thfa ANDESITE OF HAYPRESS FLAT (Miocene-Pliocene) -- Medium-gray to blue-

tuffs with angular lithic and crystal fragments and abundant

gray platy-weathering flow-banded porphyritic hypersthene-augite andesite flows and shallow intrusions. Locally vesicular with tridymite partially filling vesicles. Flow foliation defined by parallel alinement of 1- to 3-mm long plagioclase laths. May be correlative with the Leviathan Peak Andesite ANDESITE OF BAGLEY VALLEY (Miocene-Pliocene) -- Poorly exposed bluegray platy-weathering flow-banded porphyritic hornblende-augitehypersthene andesite flows and shallow intrusions. Hornblende crystals are characterically totally altered to fine-grained opaque minerals. May be correlative with the Leviathan Peak Andesite QUARTZ LATITE PORHPYRY (Wachter, 1971) (Miocene) -- White to dark-gray locally flow banded quartz latite porphyry. Contains 20 to 30

percent phenocrysts of plagioclase, hornblende, biotite, quartz, and augite set in a very pale brown glass. Includes flows, flow breccias, and shallow intrusions. Intrusive into the Relief Peak Formation and overlain by the Leviathan Peak Andesite OLIVINE BASALT (Miocene?)--Light-gray finely porphyritic flow-banded olivine basalt. Contains 1 to 2 percent small (<1 mm) olivine phenocrysts in an aphanitic groundmass. Unconformably overlies the Relief Peak Formation. May be part of Wilshire's (1957) Tryon Peak SILIFICIED ROCK (early Pliocene?) -- Includes red, brown, and yellow porous quartz-pyrite jasperoid, dense gray quartz-pyrite jasperoid, dense blue chalcedony-pyrite jasperoid, dense white quartz jasperoid, and dense white opal. Replaces volcanic tuffs, flows, and flow breccias of the Relief Peak Formation. Volcanic textures

INTRUSIVE RHYOLITE (early Pliocene?) -- White to pale-reddish-brown flow-banded sparsely porphyritic quartz sanidine rhyolite. Contains 2 to 5 percent quartz or cristobalite, sanidine, and locally, biotite phenocrysts (0.5-2 mm long) in an aphanitic or micrcrystalline groundmass. Consists of 8 small plugs intruding massive andesite flows and flow breccias of the Relief Peak Formation. Associated with hydrothermal alteration and Au-Ag mineralization at the Zaca mine on Colorado Hill. Morton and others (1977) report K-Ar ages of 4.76±0.19 m.y. (whole rock) and 4.95±0.24 m.y. (sericite) for altered rhyolite from Zaca mine INTRUSIVE ANDESITE (Miocene?) -- Includes a dark-gray porphyritic hornhlende andesite body about 3 km north of the Leviathian mine containing 12 to 15 percent, 2- to 8-mm-long hornblende phenocrysts; a small porphyritic augite andesite body about 3 km southwest of the Leviathan mine; and a dark-gray vesicular

DACITE (Miocene?) -- White, gray, black, and reddish-brown flow-banded porphyritic biotite-augite-hornblende dacite flows, flow breccias, and intrusions exposed in the north-central part of t quadrangle. Consists of 10 to 20 percent phenocrysts plagioclase, hornblende, augite, biotite, and hypersthene(in decreasing abundance) set in pale-brown glass. Intrusive into and overlying lahars of the Relief Peak Formation INTRUSIVE DACITE (Miocene(?)-Pliocene)--Includes a dark-gray porphyritic hornblende dacite porphyry on Wild Oat Moumtain

porphyritic hornblende andesite about 3 km south of Moniter Pass

locally containing sparse quartz xenocrysts and 0 to 5 percent

subrounded bouldery sand and gravel. Limited to the head of a north-trending drainage about 6,000 ft between Slinkards and containing 7 to 10 percent hornblende, plagioclase, and quartz henocrysts in a microcrystalline quartz-feldspar matrix and a PEDIMENT DEPOSITS (Pleistocene and (or) Pliocene) -- Coarse subangular gravel and sandy gravel. Caps 80 m high erosion surface remnant at white to blue-gray hornblende dacite porphyry approximately 2 km northwest of Wolf Creek Meadows containing approximately 20 percent the north end of Slinkards Valley
YOUNGER ANDESITE (late Miocene-early Pliocene)--Dark-gray porphyritic hornblende and plagioclase phenocrysts (1-3 mm long) and sparse quartz phenocrysts in a cryptofelsite groundmass
MINEHAHA ANDESITE (Noble, 1962) (Miocene?)--Chalky green, lavender, to 5-mm phenocrysts of plagioclase, hypersthene, and hornblende in an aphanitic groundmass. Overlies the dacite of Silver Peak DACITE OF SILVER PEAK (late Miocene-early Pliocene)--Highly variable and red, porphyritic augite andesite, hornblende andesite, and dacite flows exposed in the extreme northeast corner of the quadrangle. Locally propylitized orange to white flow-handed locally vesicular classy porphyriti

RELIEF PEAK FORMATION (Slemmons, 1966) (Miocene) -- Undifferentiate andesite and basalt flows, flow breccias, lahars, minor shallow intrusive rocks, and minor volcaniclastic sediments. Includes yroxene andesite lahars, hypersthene-augite andesite flows, hornblende-hypersthene-augite andesite flows, minor olivine basalt flows, biotite-hornblende andesite flows, and minor volcaniclastic andstone and conglomerate. Stippled areas are composed primarily of dark-orange-brown-weathering andesitic lahars. Locally strongl (1951) and Goskey Canyon Andesites and Markleeville Volcanics of Wachter (1971). K-Ar ages of 9.5±0.3 m.y. (biotite) and 9.7±0.4 m.y. are reported by Morton and others (1977) for a biotitehornblende andesite flow near the Morningstar mine
TOPAZ LAKE PORPHYRITIC QUARTZ MONZONITE (Curtis, 1951) (Late Cretaceous) -- Light-gray to white medium-grained porphyritic biotite granite to granodiorite characteristically containing 5 to percent, 2 to 10 cm pink microcline perthite megacrysts and 0 to 5 percent fine-grained ragged biotite crystals. Includes minor pegmatitic and medium-grained alaskitic border phases. A biotite K-Ar age of 82.1 m.y. is reported by Evernden and Kistler (1970) for a sample collected along Wolf Creek GRANOLIORITE OF THE CHINA GARDEN PLUTON (Schweikert, 1976) (Late Cretaceous)--Pinkish-gray to white medium-grained seriate, hormblende-biotite granite to granodiorite containing approximately percent anhedral hornblende and 5 percent anhedral biotite

Includes porphyritic, granophyric, and foliated border phases. R. Kistler (oral commun., 1980) reports a whole-rock Rb-Sr isochron age of 92.1±2.7 m.y.
METADACITE (Schweikert, 1976) (Late Cretaceous?)--Dark-gray finegrained schistose metadacite welded tuff containing 15 to 20 percent broken plagioclase crystals and locally abundant 1- to 3-mm clots of fine-grained biotite. Intrudes and overlies DOUBLE SPRINGS FORMATION (Noble, 1962) (Upper Jurassic-Cretaceous) --Rhyolitic to andesitic flows, flow breccias, and tuff breccias with interbedded volcaniclastic sandstone, conglomerate, and minor

overlies the Preachers Formation PREACEERS FORMATION (Noble, 1962) (Lower Jurassic) -- Well sorted fine grained lithic arenite and wacke metamorphosed to lower greenschist facies. Unconformably overlies the Gardnerville Formation GARDNERVILLE FORMATION UNDIFFERENTIATED (Noble, 1962) (Upper Trimasic?-Lower Jurassic) -- Includes intermediate to felsic volcanio conglomerate with lesser volcanic sandstone and siltstone, carbonate-volcanic clast conglomerate, limestone, black pyritic marine siltstone and intermediate tuffs metamorphosed to lower METARHYOLITE (Schweikert, 1976) (pre-Late Cretaceous) -- Chalky white,

brown- to orange-weathering fine-grained schistose, blastoporphyritic metarhyolite. Breccia textures are locally preserved. Intrusive into the West Antelope Sequence WEST ANTELOPE SEQUENCE (Schweikert, 1976) (Lower Jurassic?)--Darkbrown to black fine-grained tuffaceous sandstone and siltstone interbedded with minor conglomerate, limestone, and rhyolite tuff(?). Metamorphosed to greenschist facies schist, phyllite, granofels, marble, and felsite. Biotite hornfels locally present contacts with the Topaz Lake Quartz Monzonite and the China Garden Pluton. Exact age is unknown but Schweikert (1976) suggests a lower Jurassic age. May be correlative with the Gardnerville

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